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| 10/604,683 | 08/10/2003 | Chih-Sheng Chou | LUCP0007USA | 1682 |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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|------------------------------|------------------------|--|---------------------|--|
| Office Action Summary | Application No. | | Applicant(s) | |
| | 10/604,683 | | CHOU ET AL. | |
| | Examiner | | Art Unit | |
| | Stephen C. Hung | | 2615 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims **1-4, 6-8, 10-12, 14-16, 18, and 20-28** rejected under 35 U.S.C. 102(b) as being anticipated by **Schotz et al. (5,946,343)**.

Consider **claim 1**, Schotz teaches an apparatus (Figure 1) for transmitting and receiving multiplexed audio and data information, the apparatus being adapted to a wireless audio system for receiving a plurality of input signals of various types, the plurality of input signals at least comprising an analog audio signal, a first digital audio signal, and a control signal, the apparatus comprising:

an analog-to-digital converter (Figure 8A, A/D 52) for transforming the analog audio signal (Figure 8A, signals 30A,B) to a second digital audio signal (Figure 8A, signals 68A,B,C);

a signal-selecting device (Figure 8A, switch 80) electrically connected to the analog-to-digital converter for selecting either the first digital audio signal (Figure 8A, signals 76A,B,C) or the second digital audio signal (Figure 8A, signals 68A,B,C) for outputting;

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a digital-signal-format transformer (Figure 8A, encoder 300) electrically connected to the signal-selecting device for transforming the first digital audio signal or the second digital audio signal into a pulse audio signal; and

a synthesizing module (Figure 8A, DSP 500) electrically connected to the digital-signal-format transformer for merging the control signal (Figure 8A, clock 66) and the pulse audio signal into a digital signal of bit-stream form ("The DSP 500 embeds synchronization information into the digital audio bit stream," column 16, lines 34-35).

Consider **claim 2**, Schotz teaches the apparatus of claim 1, wherein the pulse audio signal conforms to a pulse-code modulation (PCM) specification ("16-bit PCM," column 14, lines 55).

Consider **claim 3**, Schotz teaches the apparatus of claim 1, wherein the signal-selecting device is a multiplexer for selecting either the first digital audio signal or the second digital audio signal for outputting ("switching element," column 8, line 28).

Consider **claim 4**, Schotz teaches the apparatus of claim 1, wherein the wireless audio system further comprises a modulation module (Figure 8B, circuit 403) electrically connected to the synthesizing module for modulating the digital signal of bit-stream form to generate a corresponding baseband signal.

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Consider **claim 6**, Schotz teaches the apparatus of claim 4, wherein the wireless audio System further comprises a transmitting circuit (Figure 8B, amp 516) electrically connected to the modulation module (Figure 8B, circuit 403) for transforming the baseband signal into a RF signal and for transmitting the RF signal to a free space ("RF transmission," column 13, line 1).

Consider **claim 7**, Schotz teaches the apparatus of claim 6, wherein the wireless audio system further comprises a receiver comprising:

a receiving circuit (Figure 5A, BPF 138) for receiving the RF signal and for generating a corresponding baseband;

a demodulation module (Figure 5A, circuitry 42) electrically connected to the receiving circuit for demodulating the baseband signal into a digital signal of bit-stream form ("the receiver's digital audio circuitry 42 then demodulates the audio information from the broadcast signal 36 into respective digital output signals," column 6, lines 47-50);

a separating module (Figure 5A, recovery circuit 194) electrically connected to the demodulation module for separating the digital signal of bit-stream form into a control signal (Figure 5A, clock signal 203) and a pulse audio signal (Figure 5A, signals 196A,B,C);

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a digital-signal-format transformer (Figure 5B, decoder 198) electrically connected to the separating module for transforming the pulse audio signal into a digital audio signal;

a signal-judging device (Figure 5B, MPEG decoder 400) electrically connected to the digital-signal-format transformer for classifying the digital audio signal into either a first digital audio signal (Figure 5B, signals 228A,B,C) or a second digital audio signal (Figure 5B, signals 229A,B,C); and

a digital-to-analog converter (Figure 5B, D/A 216) electrically connected to the signal-judging device for transforming the second digital audio signal into an analog audio signal.

Consider **claim 8**, Schotz teaches the apparatus of claim 7, wherein signal-judging device (Figure 5B, decoder 400) is a de-multiplexer ("demultiplexing," column 13, line 33) for classifying the digital audio signal into either the first digital audio signal (Figure 5B, signals 228A,B,C) or the second digital audio signal (Figure 5B, signals 229A,B,C).

Consider **claim 10**, Schotz teaches an apparatus for transmitting and receiving multiplexed audio and data information in a wireless audio system for receiving a digital signal of bit-stream form, the apparatus comprising:

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a separating module (Figure 5A, recovery circuit 194) for separating the digital signal of bit-stream form into a control signal (Figure 5A, clock 203) and a pulse audio signal (Figure 5A, signals 196A,B,C);

a digital-signal-format transformer (Figure 5B, decoder 198) electrically connected to the separating module for transforming the pulse audio signal into a digital audio signal;

a signal-judging device (Figure 5B, MPEG Decoder 400) electrically connected to the digital-signal-format transformer for classifying the digital audio signal into either a first digital audio signal (Figure 5B, signals 228A,B,C) or a second digital audio signal (Figure 5B, signals 229A,B,C); and

a digital-to-analog converter (Figure 5B, D/A 216) electrically connected to the signal-judging device for transforming the second digital audio signal into an analog audio signal.

Consider **claim 11**, Schotz teaches the apparatus of claim 10, wherein signal-judging device (Figure 5B, Decoder 400) is a de-multiplexer ("demultiplexing," column 13, line 33) for classifying the digital audio signal into either the first digital audio signal (Figure 5B, signals 228A,B,C) or the second digital audio signal (Figure 5B, signals 229A,B,C).

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Consider **claim 12**, Schotz teaches the apparatus of claim 10, wherein the wireless audio system further comprises a receiving circuit and a demodulation module, wherein the receiving circuit (Figure 5A, BPF 138) is used for receiving a RF signal to generate a corresponding baseband signal, and the demodulation module (Figure 5A, circuitry 42) is electrically connected to the receiving circuit for demodulating the baseband signal into a digital signal of bit-stream form ("The receiver's digital audio circuitry 42 then demodulates the audio information from the broadcast signal 36 into respective digital output signals," column 6, line 47-50);

Consider **claim 14**, Schotz teaches the apparatus of claim 10, wherein the pulse audio signal conforms to a pulse-code modulation (PCM) specification ("16-bit PCM," column 14, line 55).

Consider **claim 15**, Schotz teaches the apparatus of claim 10, wherein the wireless audio system further comprises a transmitter for receiving a plurality of input signals of various types, the plurality of input signals at least comprising an analog audio signal, a first digital audio signal, and a control signal, the transmitter comprising:

an analog-to-digital converter (Figure 8A, A/D 52) for transforming the analog audio signal (Figure 8A, signals 30A,B) to a second digital audio signal (Figure 8A, signals 68A,B,C);

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a signal-selecting device (Figure 8A, switch 80) electrically connected to the analog-to-digital converter for selecting either the first digital audio signal (Figure 8A, signals 76A,B,C) or the second digital audio signal (Figure 8A, signals 68A,B,C) for outputting;

a digital-signal-format transformer (Figure 8A, encoder 300) electrically connected to the signal-selecting device for transforming the first digital audio signal or the second digital audio signal into a pulse audio signal; and

a synthesizing module (Figure 8A, DSP 500) electrically connected to the digital-signal-format transformer for merging the control signal (Figure 8A, clock 66) and the pulse audio signal into a digital signal of bit-stream form ("The DSP 500 embeds synchronization information into the digital audio bit stream," column 16, lines 34-35).

a modulation module (Figure 8B, circuit 403) electrically connected to the synthesizing module for modulating the digital signal of bit-stream form to generate a corresponding baseband signal.

a transmitting circuit (Figure 8B, amp 516) electrically connected to the modulation module for transforming the baseband signal into a RF signal and for transmitting the RF signal to a free space ("RF transmission," column 13, line 1).

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Consider **claim 16**, Schotz teaches the apparatus of claim 15, wherein the signal-selecting device is a multiplexer for selecting either the first digital audio signal or the second digital audio signal for outputting ("switching element," column 8, line 28).

Consider **claim 18**, Schotz teaches a wireless audio system for transmitting and receiving multiplexed audio and data information comprising:

a transmitter (Figure 8A,B) for receiving a plurality of input signals of various types, the plurality of input signals at least comprising a first digital audio input signal (Figure 8A, signals 30C,D), and a control input signal (Figure 8A, clock 66), the transmitter comprising:

a selecting-synthesizing device (Figure 8A, circuit 28) for transforming the first digital audio input signal into a transformed digital audio signal Figure 8A, signals 76A,B,C) and then for merging the transformed digital audio signal with the control input signal to generate a digital input signal of bit-stream form ("The DSP 500 embeds synchronization information into the digital audio bit stream," column 16, lines 34-35);

a modulation module (Figure 8B, circuit 403) electrically connected to the selecting-synthesizing device for modulating the digital signal of bit-stream form to generate a corresponding baseband signal.

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a transmitting circuit (Figure 8B, amp 516) electrically connected to the modulation module for transforming the baseband signal into a RF signal and for transmitting the RF signal to a free space ("RF transmission," column 13, line 1).

a receiver (Figure 5A,B) for receiving the RF signal to output a plurality of output signals of various types, the receiver comprising:

a receiving circuit (Figure 5A, circuitry 42) for receiving the RF signal and for generating a corresponding baseband signal;

a demodulation module (Figure 5B, circuit 46) electrically connected to the receiving circuit for demodulating the baseband signal into a digital signal of bit-stream;

a separating-classifying device (Figure 5B, circuit 136) for separating the digital signal of bit-stream form into a control output signal (Figure 5B, clock 203) and a first digital audio output signal (Figure 5A, signals 196 A,B,C);

wherein the first digital audio output signal (Figure 5B, signals 48 C,D) and the control output signal (Figure 5B, clock 203) respectively correspond to the first digital audio input signal (Figure 8A, signals 30C,D) and the control input signal (Figure 8A, clock 66).

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Consider **claim 20**, Schotz teaches the wireless audio system of claim 18, wherein the plurality of input audio signals further comprise an analog audio input signal (Figure 8A, signals 30A,B).

Consider **claim 21**, Schotz teaches the wireless audio system of claim 20, wherein the transmitter further comprises an analog-to-digital converter (Figure 8A, A/D 52) for transforming the analog audio input signal (Figure 8A, signals 30A,B) into a corresponding second digital audio signal (Figure 8A, signals 68A,B,C), and the selecting-synthesizing device (Figure 8A, switch 80) selects either the first digital audio input signal (Figure 8A, signals 76A,B,C) or the second digital audio input signal (Figure 8A, signals 68A,B,C) for a signal-format transforming process;

Consider **claim 22**, Schotz teaches the wireless audio system of claim 21, wherein the separating-classifying device of the receiver is used to determine that the digital audio output signal is either a first digital audio output signal (Figure 5B, signals 229A,B,C) or a second digital audio output signal (Figure 5B, signals 228A,B,C).

Consider **claim 23**, Schotz teaches the wireless audio system of claim 22, wherein the receiver further comprises a digital-to-analog converter (Figure 5B, D/A 216) electrically connected to the separating-classifying device for transforming the second digital audio output signal into a corresponding analog audio output signal.

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Consider **claim 24**, Schotz teaches the wireless audio system of claim 23, wherein the analog audio output signal (Figure 5B, signal 48A,B) and the second digital audio output signal (Figure 5B, signals 228A,B,C) respectively correspond to the analog audio input signal (Figure 8A, signals 30A,B) and the second digital audio input signal (Figure 8A, signals 68A,B,C).

Consider **claim 25**, Schotz teaches the wireless audio system of claim 24, wherein the selecting-synthesizing device comprises:

a signal-selecting device (Figure 8A, switch 80) electrically connected to the analog-to-digital converter for selecting either the first digital audio signal (Figure 8A, signals 76A,B,C) or the second digital audio signal (Figure 8A, signals 68A,B,C) for outputting;

a digital-signal-format transformer (Figure 8A, encoder 300) electrically connected to the signal-selecting device for transforming the first digital audio signal or the second digital audio signal into a pulse audio signal; and

a synthesizing module (Figure 8A, DSP 500) electrically connected to the digital-signal-format transformer for merging the control signal (Figure 8A, clock 66) and the pulse audio signal into a digital signal of bit-stream form ("The DSP 500 embeds synchronization information into the digital audio bit stream," column 16, lines 34-35).

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Consider **claim 26**, Schotz teaches the wireless audio system of claim 18, wherein the pulse audio signal conforms to a pulse-code modulation (PCM) specification ("16-bit PCM," column 14, lines 55).

Consider **claim 27**, Schotz teaches the wireless audio system of claim 24, wherein the separating-classifying device comprises:

a separating module (Figure 5A, recovery circuit 194) electrically connected to the demodulation module for separating the digital signal of bit-stream form into a control signal (Figure 5A, clock signal 203) and a pulse audio signal (Figure 5A, signals 196A,B,C);

a digital-signal-format transformer (Figure 5B, decoder 198) electrically connected to the separating module for transforming the pulse audio signal into a digital audio signal;

a signal-judging device (Figure 5B, MPEG decoder 400) electrically connected to the digital-signal-format transformer for classifying the digital audio signal into either a first digital audio signal (Figure 5B, signals 228A,B,C) or a second digital audio signal (Figure 5B, signals 229A,B,C);

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Consider **claim 28**, Schotz teaches the wireless audio system of claim 18, wherein the pulse audio signal conforms to a pulse-code modulation (PCM) specification ("16-bit PCM," column 14, lines 55).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. **Claims 5, 9, 13, 17, 19, and 29** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schotz et al. (US 6,671,325 B2)** in view of **KHAYRALLAH et al. (US 2001/0044294 A1)**.

Consider **claim 5**, Schotz teaches the apparatus of claim 4 having a modulation module.

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However, Schotz does not explicitly teach that the modulation module comprises a modulation circuit electrically connected to the synthesizing module for modulating the digital signal of bitstream form to generate a modulated signal; and a spreading circuit electrically connected to the modulation circuit for proceeding operations between the modulated signal and a spreading code to generate the baseband signal.

In the same field of endeavor, KHAYRALLAH et al. teaches a modulation module (Figure 6A) comprising a modulation circuit (Figure 6A, pi/4 DQPSK Modulating 513) for modulating the digital signal of bitstream form to generate a modulated signal ("the encoded and interleaved bits are then modulated," paragraph [0049]); and a spreading circuit (Figure 6A, WalshHadamard Coding 611) electrically connected to the modulation circuit (Figure 6A, pi/4 DQPSK Modulating 513) for proceeding operations between the modulated signal and a spreading code ("spreading code," paragraph [0012]) to generate the baseband signal (Figure 6A, radio communications signal 515).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the modulation circuit and spreading circuit of KHAYRALLAH into the modulation module of Schotz.

This would be advantageous since "CDMA communications can be less vulnerable to coherent noise sources which might jam other communications signals" and "The use of

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the unique spreading code allows several channels to effectively share the same bandwidth" (KHAYRALLAH et al., paragraph [0012]).

Consider **claim 9**, Schotz teaches the apparatus of claim 7 having a demodulation module.

However, Schotz does not explicitly teach that the demodulation module comprises a de-spreading circuit and a demodulation circuit, wherein the de-spreading circuit executes a convolution/multiplication operation between the baseband signal and a spreading code to transform the baseband signal into a de-spreading signal, and the demodulation circuit then demodulates the de-spreading signal to generate the digital signal of bit-stream form.

In the same field of endeavor, KHAYRALLAH et al. teaches a demodulation module (Figure 6B) comprising a de-spreading circuit (Figure 6B, Walsh Hadmard Transform 652) and a demodulation circuit (Figure 6B, coherent demodulating 551), wherein the de-spreading circuit (Figure 6B, Walsh Hadmard Transform 652) executes a convolution/multiplication operation ("convolutional coding," paragraph [0047]) between the baseband signal (Figure 6B, radio communications signal 515) and a spreading code ("spreading code," paragraph [0012]) to transform the baseband signal (Figure 6B, radio communications signal 515) into a de-spreading signal, and the demodulation circuit (Figure 6B, coherent demodulating 551) then demodulates the de-spreading

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signal to generate the digital signal of bit-stream form (Figure 6B, Data Link Layer frame 410').

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the demodulation circuit and despreading circuit of KHAYRALLAH et al. into the modulation module of Schotz.

This would be advantageous since "CDMA communications can be less vulnerable to coherent noise sources which might jam other communications signals" and "The use of the unique spreading code allows several channels to effectively share the same bandwidth" (KHAYRALLAH et al., paragraph [0012]).

Consider **claim 13**, Schotz teaches the apparatus of claim 12 having a demodulation module.

However, Schotz does not explicitly teach that the demodulation module comprises a de-spreading circuit and a demodulation circuit, wherein the de-spreading circuit executes a convolution/multiplication operation between the baseband signal and a spreading code to transform the baseband signal into a de-spreading signal, and the demodulation circuit then demodulates the de-spreading signal to generate the digital signal of bit-stream form.

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In the same field of endeavor, KHAYRALLAH et al. teaches a demodulation module (Figure 6B) comprising a de-spreading circuit (Figure 6B, Walsh Hadmard Transform 652) and a demodulation circuit (Figure 6B, coherent demodulating 551), wherein the de-spreading circuit (Figure 6B, Walsh Hadmard Transform 652) executes a convolution/multiplication operation ("convolutional coding," paragraph [0047]) between the baseband signal (Figure 6B, radio communications signal 515) and a spreading code ("spreading code," paragraph [0012]) to transform the baseband signal (Figure 6B, radio communications signal 515) into a de-spreading signal, and the demodulation circuit (Figure 6B, coherent demodulating 551) then demodulates the de-spreading signal to generate the digital signal of bit-stream form (Figure 6B, Data Link Layer frame 410').

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the demodulation circuit and despreding circuit of KHAYRALLAH into the modulation module of Schotz .

This would be advantageous since "CDMA communications can be less vulnerable to coherent noise sources which might jam other communications signals" and "The use of the unique spreading code allows several channels to effectively share the same bandwidth" (KHAYRALLAH et al., paragraph [0012]).

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Consider **claim 17**, Schotz teaches the apparatus of claim 15 having a modulation module.

However, Schotz does not explicitly teach that the modulation module comprises a modulation circuit electrically connected to the synthesizing module for modulating the digital signal of bitstream form to generate a modulated signal; and a spreading circuit electrically connected to the modulation circuit for proceeding operations between the modulated signal and a spreading code to generate the baseband signal.

In the same field of endeavor, KHAYRALLAH et al. teaches a modulation module (Figure 6A) comprising a modulation circuit (Figure 6A, pi/4 DQPSK Modulating 513) for modulating the digital signal of bitstream form to generate a modulated signal ("the encoded and interleaved bits are then modulated," paragraph [0049]); and a spreading circuit (Figure 6A, WalshHadamard Coding 611) electrically connected to the modulation circuit (Figure 6A, pi/4 DQPSK Modulating 513) for proceeding operations between the modulated signal and a spreading code ("spreading code," paragraph [0012]) to generate the baseband signal (Figure 6A, radio communications signal 515).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the modulation circuit and spreading circuit of KHAYRALLAH et al. into the modulation module of Schotz.

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This would be advantageous since “CDMA communications can be less vulnerable to coherent noise sources which might jam other communications signals” and “The use of the unique spreading code allows several channels to effectively share the same bandwidth” (KHAYRALLAH et al., paragraph [0012]).

Consider **claim 19**, Schotz teaches the apparatus of claim 18 having a modulation module.

However, Schotz does not explicitly teach that the modulation module comprises a modulation circuit being a $\pi/4$ DQPSK modulation circuit and electrically connected to the synthesizing module for modulating the digital signal of bitstream form to generate a modulated signal; and a spreading circuit electrically connected to the modulation circuit for proceeding operations between the modulated signal and a spreading code to generate the baseband signal.

In the same field of endeavor, KHAYRALLAH et al. teaches a modulation module (Figure 6A) comprising a $\pi/4$ DQPSK modulation circuit (Figure 6A, $\pi/4$ DQPSK Modulating 513) for modulating the digital signal of bitstream form to generate a modulated signal (“the encoded and interleaved bits are then modulated,” paragraph [0049]); and a spreading circuit (Figure 6A, WalshHadamard Coding 611) electrically connected to the modulation circuit (Figure 6A, $\pi/4$ DQPSK Modulating 513) for proceeding operations between the modulated signal and a spreading code (“spreading

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code,” paragraph [0012]) to generate the baseband signal (Figure 6A, radio communications signal 515).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the modulation circuit and spreading circuit of KHAYRALLAH et al. into the modulation module of Schotz.

This would be advantageous since “CDMA communications can be less vulnerable to coherent noise sources which might jam other communications signals” and “The use of the unique spreading code allows several channels to effectively share the same bandwidth” (KHAYRALLAH et al., paragraph [0012]).

Consider **claim 29**, Schotz teaches the apparatus of claim 18 having a demodulation module.

However, Schotz does not explicitly teach that the demodulation module comprises a de-spreading circuit and a $\pi/4$ DQPSK demodulation circuit, wherein the de-spreading circuit executes a convolution/multiplication operation between the baseband signal and a spreading code to transform the baseband signal into a de-spreading signal, and the demodulation circuit then demodulates the de-spreading signal to generate the digital signal of bit-stream form.

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In the same field of endeavor, KHAYRALLAH et al. teaches a demodulation module (Figure 6B) comprising a de-spreading circuit (Figure 6B, Walsh Hadmard Transform 652) and a $\pi/4$ DQPSK demodulation circuit (Figure 6B, coherent demodulating 551 and “ $\pi/4$ DQPSK,” paragraph [0049]), wherein the de-spreading circuit (Figure 6B, Walsh Hadmard Transform 652) executes a convolution/multiplication operation (“convolutional coding,” paragraph [0047]) between the baseband signal (Figure 6B, radio communications signal 515) and a spreading code (“spreading code,” paragraph [0012]) to transform the baseband signal (Figure 6B, radio communications signal 515) into a de-spreading signal, and the demodulation circuit (Figure 6B, coherent demodulating 551) then demodulates the de-spreading signal to generate the digital signal of bit-stream form (Figure 6B, Data Link Layer frame 410’).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the demodulation circuit and despreding circuit of KHAYRALLAH et al. into the modulation module of Schotz.

This would be advantageous since “CDMA communications can be less vulnerable to coherent noise sources which might jam other communications signals” and “The use of the unique spreading code allows several channels to effectively share the same bandwidth” (KHAYRALLAH et al., paragraph [0012]).

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen C. Hung whose telephone number is (571)270-1457. The examiner can normally be reached on M-Th 7:30am-5pm, Every other Friday 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571)272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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